

BRIEFER ARTICLES

HYBRID PERENNIAL SUNFLOWERS

From time to time references have been made to supposed hybrids between the perennial sunflowers, but there has been no systematic investigation of the subject. Such hybrids, if formed, might in many cases reproduce vegetatively, and so give rise to an essentially uniform group of plants of considerable extent, having the aspect of a true species.

At Boulder, Colorado, *Helianthus orgyalis* and *H. Maximiliani* have been growing in close proximity for a number of years. There has appeared close to these plants a distinct form which can hardly be anything but a hybrid between the two. Possibly such hybrids will be found growing wild in Nebraska, Missouri, or Texas, if anywhere the ranges of the parent species overlap. In order to bring out the characters of the new plant it is necessary partly to redescribe the supposed parents, especially since the descriptions in the manuals omit several significant characters. The 3 plants involved will be distinguished by the following numbers: (1) *H. orgyalis* DC.; (2) *H. orgyaloides*, nov. (the presumed hybrid); (3) *H. Maximiliani* Schrad.

Stems: (1) very smooth and glaucous to top, much branched, the branches slender; (2) essentially smooth, but roughish to the touch above, nearly as stout as in *Maximiliani*, and with few branches or short peduncles as in *Maximiliani*; (3) stout, little branched, scurfy, with matted white hairs, thinly hairy at top.

Leaves: (1) linear, crowded on stem, 1-nerved, but with a strong marginal nervure; surface glabrous; margins slightly undulate, with mere traces of obsolete teeth; width of stem leaf 6 mm.; (2) linear, appearing as in *orgyalis*, but up to 12 mm. broad, rough to the touch, remotely and indistinctly subdentate; a continuous but looped submarginal nervure; (3) broadened, narrow lanceolate, grayish, more or less scabrous on both sides, margins remotely and feebly dentate; no continuous marginal nervure; width of stem leaf 26 mm.

Peduncles: (1) slender; (2) stoutish; (3) stout.

Disk: (1) dark; (2) yellow, pale green in bud; (3) yellow.

Phyllaries: (1) linear, long, and spreading; (2) long, narrow, and spreading, of the *orgyalis* type; (3) lanceolate, loose, and spreading.

Rays: (1, 2, 3,) without pistils; (1) 11-14, rather more decidedly orange than in *Maximiliani*, and more or less bifid at end; (2) 14-21, clear bright orange-yellow, essentially *Maximiliani* color, many with tips deeply bifid; (3) 30, light yellow, more or less emarginate at end, and largely in 2 rows.

Diameter of disk: (1) about 10 mm.; (2) about 16 mm.; (3) about 17 mm.

Disk bracts: (1) very hairy at end, covering disk buds at early stage; no produced naked tips; (2) very hairy at end, covering disk buds at early stage, and with short naked tips; (3) hairy at end, covering disk buds at early stage, their tips elongate and sharp, pale green, not hairy.

Stigmatic branches: (1, 2, 3) orange.

Achenes: (1, 2, 3) entirely glabrous.

Pappus scales: (1) 2, about or hardly half length of corollas; (2) 2, about as long as in *orgyalis*, sometimes with well defined intermediate squamellae; (3) over half length of corollas.

The hybrid is on the whole intermediate. It is surprising that the dark disk is not dominant. A remarkable feature is the deeply bifid ends of the rays in the hybrid, greatly exaggerating the character of the parents. The appearance of intermediate pappus squamellae is a common feature in true *orgyalis*. Essentially this hybrid is evidently known to the trade, although not described. We have a purchased plant belonging to it, but differing from the one just described in the following particulars: stems freely branching as in *orgyalis*, and plant as tall as *orgyalis*;¹ disk olive green in bud; peduncles rather slender; rays 18-24, only slightly emarginate at end; disk about 15 mm. in diameter; lobes of disk corollas light orange, the extreme tips reddened, or whole lobe suffused with red. F. C. HEINEMANN, of Erfurt, Germany, advertised a supposed hybrid of this group, calling it *H. perennis hybridus pyramidalis*; but from his figure it seems to be simply *H. Maximiliani*.

It is clear that our hybrid does not agree with *H. Dalyi* Britton or *H. Kellermani* Britton. Dr. J. C. ARTHUR writes me that some years ago, near Madison, Wisconsin, he saw a considerable growth of *H. Kellermani*, and near by *H. grosseserratus* and *H. orgyalis*, or what appeared to be such. He had the idea that *H. Kellermani* was a hybrid between the latter plants, but on attempting to make the same cross

¹C. PURDY (1916) advertises a very tall form of *H. Maximiliani*, said to grow to 11 ft. in height. Is this perhaps a hybrid?

artificially at Lafayette, he was unable to get any seed. *H. Dalyi*, according to FARWELL, is a variety of *H. Maximiliani*, related to it much as var. *oppositifolius* Farwell is related to *H. giganteus*. An effort should be made, however, to raise a *giganteus*×*Maximiliani* hybrid. *H. ambiguus* (Gray) Britton is supposed to be a hybrid *giganteus*×*divaricatus*, or at any rate to have *giganteus* as one parent. THELLUNG records a garden hybrid *laetiflorus*×*rigidus*, and the plant called *H. serotinus* Tausch (1828) is supposed to be *strumosus*×*rigidus*. Evidently there is a great deal to be done, both in the field and in the garden, before we can reach a fairly clear understanding of this subject. It seems possible that in this genus the origin, through hybridization, of distinct plants, with the attributes of species, may be demonstrated.—T. D. A. COCKERELL, *University of Colorado, Boulder, Colo.*

RELATIONSHIPS WITHIN THE RHODOSPOREAE

During the last 15 or 20 years the author has studied the structure of 30 to 40 species of *Pluteus* and 4 or 5 species of *Volvaria*. In all of these species, without a single exception, the trama of the lamellae presents a curious and interesting structure. In the majority of the Agaricaceae, the trama hyphae of the lamellae lie, in general, in a parallel direction, as in *Mycena*, *Tricholoma*, *Collybia*, *Inocybe*, *Entoloma*, *Leptonia*, etc. In *Russula* and *Lactarius* many of the cells are so swollen that the trama of the lamellae presents a vesiculose appearance. In *Amanita* the hyphae show a strong divergence from the median plane toward the subhymenium as they descend in the trama.

In *Pluteus* and *Volvaria*, on the other hand, the most prominent hyphae converge as they descend in the trama of the lamellae. Along the median plane of the lamella there can usually be seen, in section, a layer of hyphae (sometimes more slender) against which these prominent cells converge. Attention was called to this peculiar structure in *Pluteus seticeps* in 1902,² but no interpretation was offered as to its origin or significance.

During the summer of 1917, Professor LEVA B. WALKER, of the University of Nebraska, while studying the development of *Pluteus*

² See *Leptonia seticeps* Atkinson, Jour. Myc. 8:116. 1902. Further collections and studies of this species show that it is a *Pluteus*. While the gills are attached to the stem before the expansion of the plant, they become free, rounded behind, and distant from the stipe. The stipe also easily separates from the pileus, and other structural characters are clearly those of *Pluteus*. It is therefore *Pluteus seticeps* Atkinson, ined.